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VOLUME XXXI SEPTEMBER, 1932 NUMBER 6

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Geographical Publications . . . . . .

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George J. Miller, *Editor*

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Dr. Coulter is head of the Department of Geography, University of Hawaii, and author of many contributions to geographical literature. Among these are: A Dot Map of the Distribution of Population in Japan, and Land Utilization in the Santa Lucia Region in the *Geographical Review;* A Critical Situation in Two One-Crop Wheat Farming Districts in California and San Luis Obispo, *Economic Geography;* Luci: An Isolated District in California, in *Bulletin of Geographical Society of Philadelphia.* This is the twenty-third article in our Human Geography Series.

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The JOURNAL *of* GEOGRAPHY

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VOLUME XXXI SEPTEMBER, 1932 NUMBER 6

THE ISLAND OF HAWAII

JOHN WESLEY COULTER
University of Hawaii

The island of Hawaii, the largest in the group of islands by this name, has an area of 4,015 square miles. This is twice the area of all the other islands combined. It is composed wholly of lava poured out on the floor of the ocean by five volcanoes, the highest of which reaches nearly 14,000 feet above sea level. The various economic activities carried on by the people are related to different natural conditions found within its borders. The rainy eastern coast is devoted almost exclusively to the raising of sugar cane; the coffee industry is carried on in a restricted district on the drier west side of the island; pineapples are cultivated on a plateau in the north where the soil is rich and well drained; cattle raising

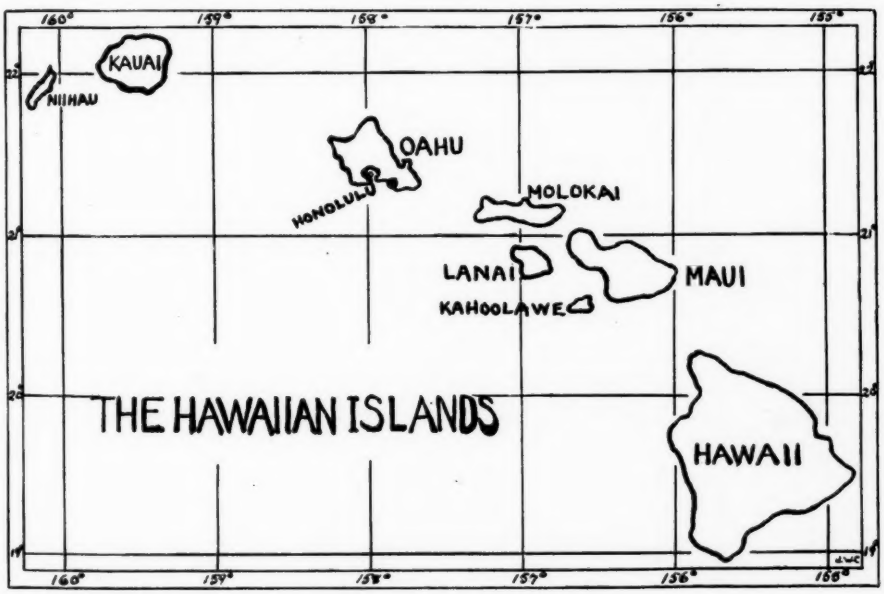

FIG. 1. Map of Hawaiian Islands.

FIG. 2. A Close-up View of Growing Sugar Cane. Photo by R. J. Baker.

FIG. 3. Harvesting Sugar Cane. Photo by R. J. Baker.

is the most important activity on the grassy slopes of high elevations; and general farming is carried on in scattered locations. In some parts of the island there are groups of people who look after the welfare of thousands of tourists who visit this part of the tropics every year.

THE SUGAR INDUSTRY

The raising of sugar cane is the most important economic activity on Hawaii. In 1930, 290,331 tons of sugar were obtained from cane harvested on this island. There are twenty sugar-cane plantations, varying in size from about 2000 to 15,000 acres. Nearly all of them are along the eastern, windward coast of the island, where, in most cases, the heavy rainfall provides sufficient moisture for a crop without supplementary irrigation.[1] The mean annual rainfall at sea level on this coast varies from 100 to 140 inches. On parts of some plantations at higher elevations, the precipitation reaches as much as 200 inches a year. Local observers state that on some plantations it rains every day. Most of the cane is raised between sea level and an elevation of 2000 feet.

As the writer sailed along the Hamakua coast, famous for its sugar plantations, on an afternoon in early April, the landscape presented an interesting picture. The base of Mauna Kea Mountain sloped gradually down to a cliff about eighty feet high. The land, slightly rolling, was dissected at intervals of one-half mile to a mile by V-shaped gulches 150 to 500 feet deep. From the cliff inland five or six miles, growing sugar cane dominated the scene—a light green landscape, broken here and there by large, dark-brown patches marking fields from which the crop had been harvested and the soil ploughed. High up on the slopes, a deep green outline of forest paralleled the coast. In a few places, smoke from burning cane fields drifted slowly up the mountain, carried by a gentle breeze. Large groups of houses in clumps of trees were scattered along the coast a few hundred yards from the cliff, on top of which there were silhouetted the irregular outlines of sugar mills.

Eight varieties of sugar cane are commonly raised on Hawaii. The type varies from plantation to plantation and from field to field according to differences in rainfall, soil, and elevation. Thousands of cane seedlings are raised every year at the Experiment

[1] For a description of an irrigated sugar cane plantation in the Hawaiian Islands see, "Oahu Plantation, Waipahu," in a forthcoming number of *Economic Geography*.

Station of the Hawaii Sugar Planters' Association on the island of Oahu in a search for varieties suited to particular localities on various islands.

The growing season of sugar cane on Hawaii varies from sixteen months to two years, according to the time of planting, variety of cane, and the elevation above sea level. About one-tenth of the area of a plantation is planted each season. The harvesting of a ripe crop, the cultivation of growing cane and the planting of a new field are often carried on at the same time on a plantation.

Cuttings of cane six to eight inches long are planted end to end in rows five to six feet apart and fourteen inches deep. When the buds have sprouted, cultivation is carried on regularly between the rows for about six months, the primary object of which is the eradication of weeds. When the cane is six months old, it shades the ground sufficiently to inhibit the growth of weeds. Cultivation is generally done with hoes. On Hawaii, the youngest island geologically, a sufficient length of time has not elapsed since its formation for all the surface rock to be weathered into soil. Mantle rock and float prevent successful machine cultivation.

Full-grown cane presents an appearance something like that of ripe corn. The stalks, ten to twenty feet long, from which hang long, narrow leaves, grow so close together in stools as to resemble a jungle difficult to penetrate. In some cases a cane field is set on fire before harvesting operations begin. This process consumes the dry, dead leaves; the stalks are not injured because of the great amount of juice in them. Part of the crop is cut for "seed" before the burning takes place.

Harvesting operations present an animated scene. The cutter grasps a stalk and drives his heavy knife into it, severing it close to the base. He then tops it and cuts it into convenient lengths for subsequent handling. Laborers wield their cane knives vigorously, seldom stopping for a rest.

On the island of Hawaii, cut cane is transported to the mills, (1) by water in flumes, (2) by gravity aërial tram, or (3) by railway. The flumes are placed along the ground or on low trestles at intervals of about 150 feet. The cane cut from a strip 75 feet on each side of the flume is placed in it and carried down to the mill by running water. Most of the mills are situated on the coast and so have two advantages, namely (1) cheap transportation of the sugar cane to them and (2) cheap transportation of raw sugar from them. Before the present coast railway was built, the raw

sugar was taken from nearly all the plantations by water. Now there are many warehouses on the railway over which part of the sugar is taken to Hilo from where it is carried to a refinery on San Francisco Bay.

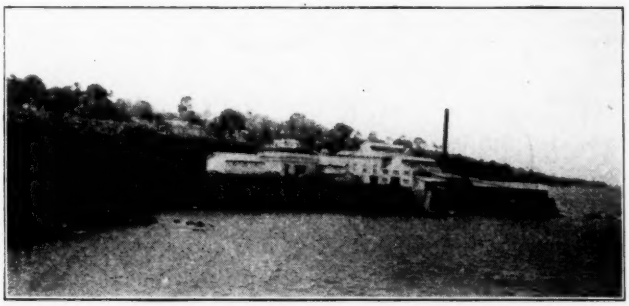

FIG. 4. Wainaku Sugar Mill, Hilo. Photo by J. W. Coulter.

After the harvest, the roots are left in the ground and new shoots or ratoons spring from them. Fertilizer is applied between the rows and the soil is cultivated. The crop is ratooned as long as the yield justifies. In some cases twenty crops have been harvested from one planting. When the yield decreases to the point of an insufficient return on the outlay, the roots are taken up, the fields ploughed and a new crop is planted.

There are 32,628 workers on sugar-cane plantations on Hawaii, of whom 11,786 are children employed mainly during the summer months.[2] They include Filipinos, Japanese, Chinese, Koreans, Portuguese, and Hawaiians.

The working day for adults is from 6:00 o'clock in the morning until about 3:30 in the afternoon, with time off for breakfast and lunch. Shelter, fuel, water, and medical treatment are provided free. When not employed in tending cane, laborers mend flumes, make roads, paint houses and do other work on a plantation. During three or four months of the year when the sugar mill is not grinding, employees overhaul the machinery and make necessary repairs.

Most of the plantations are, as far as possible, independent units economically. The isolation of the island and of many of the plantations on the island make this desirable. All of them have carpenters, plumbers, machinists, blacksmiths, and other artisans necessary to the business of producing sugar.

COFFEE PRODUCTION

Next in importance to the sugar industry on Hawaii is the production of coffee. "Kona" coffee is well known to coffee merchants

[2] Labor Conditions in the Territory of Hawaii 1929-1930, *U. S. Dept. Labor Bull.* No. 534, pp. 19, 20.

on the mainland of the United States, and gets its name from the district in which nearly all the Hawaiian coffee is produced. The localization in this district is due largely to climate. The coffee-growing area is about twenty-five miles long, and most of it lies between an elevation of 1,000 and 2,000 feet. The rainfall, about sixty inches a year, is distributed thruout the twelve months. The area is shaded much of the time by clouds which drift over the mountains in the forenoon and remain most of the day. If it were not for these clouds, it would be necessary to provide shade artificially for the coffee trees.

Coffee plantations within the district are scattered because of the scattered areas of suitable soil. There have been many lava flows in this area and where the flows have been recent there is little or no soil. In some parts of the island of Hawaii, molten rock has been poured out so lately that it still preserves the deeply wrinkled form in which it cooled when it came to rest. There are, however, areas between recent flows which have been exposed sufficiently long for the formation of soil deep enough for coffee trees.

Coffee trees grow to a height of ten to fifteen feet, and attain at the base a diameter of eight to ten inches. Branches are often bent down to the ground at harvest by the weight of the berries.

Plantations vary in size from five to fifteen acres. They are operated almost entirely by Japanese. One man and his wife and family can take care of a plantation of about seven acres except during the harvesting season. At this time extra labor is required. The routine work is not onerous and consists chiefly in hoeing weeds and fertilizing. During the harvest, schools of the district close for several days to allow the children to assist in picking.

Harvested berries are packed in sacks, marked with the name of the grower for identification and carried to coffee pulping machines. Many of these are owned jointly and used in rotation among the several part-owners. During the 1929-30 season 8,846,500 pounds of coffee were produced. The estimated yield for 1930-31 is 9,000,000 pounds.[3] Nearly all the coffee is shipped from Napoopo, which has a large tributary coffee growing area, or from Kailua, the other important coffee shipping port.

The value of raw coffee in Hawaii fluctuates considerably with world movements in this commodity, and coffee growers accordingly have waves of prosperity or financial depression. During

[3] Statistics obtained from U. S. Dept. Agric. Ext. Service, University of Hawaii.

the last three or four years, the market for Kona coffee has increased and there has been a consequent expansion of the industry. Nearly all the product is shipped to the mainland of the United States where it is used mainly for blending with imported coffee.

The coffee district is a community of small farmers who resent any attempt at consolidation. Interest in this branch of farming is stimulated by the Federal Coöperative Extension Service of the United States Department of Agriculture.

CATTLE RANCHING

On the island of Hawaii, cattle raising is still carried on with some of its old-time glamour and thrill. Cowboys throw a lariat with deftness gained by long experience. Nearly all the grazing land is above an elevation of 3000 feet. At lower levels in some places the dense tropical vegetation crowds out the grass; in others, scant rainfall and thin soil support a sparse vegetation unsuited to grazing cattle. It is customary to sow grass seed in areas best adapted to its growth. Improvement of stock ranges has been brought about thru the efforts of the Extension Service of the United States Department of Agriculture, and valuable forage plants have been introduced and established. On the middle slopes of Mauna Loa, large areas of grazing land are interspersed with forested land.

As the writer tramped across a cattle ranch at an elevation of 4000 feet on a dreary afternoon in early April, it was hard to realize that he was in the tropics. A strong northeast trade wind drove the rain in sheets across open spaces between trees thinly scattered over rolling, grassy uplands. The headquarters of the ranch, a one-story, frame building, was protected somewhat from the elements by a row of tall trees. A short distance from the main building stood a barn and a forge, and adjoining these were several corrals. Three large wooden tanks stored rain water collected from the eaves of the outbuildings.

In spite of the heavy rainfall on Hawaii, the problem of getting water for cattle is a serious one. The soil of the island is very porous because of the recency of the lava, and rain quickly sinks into the ground. A local observer stated that an hour after a rainfall of eight inches, there was no evidence of the downpour. Roofs have been erected at various places on ranches for the sole purpose of collecting rain. After a period of two or three weeks of fair weather, a serious shortage of water occurs.

There are fifty-one beef-cattle ranches on the island, varying in size from a few score acres to half a million acres and supporting 55,010 cattle, a much larger number of both ranches and cattle than an any other island in the group.[4] The Parker ranch, the largest on the island, has 22,000 animals.

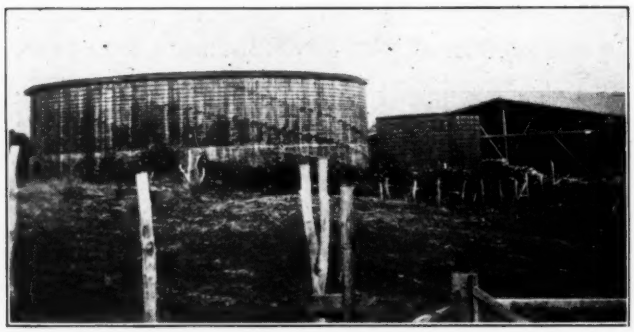

FIG. 5. Water storage tanks. Rain water is collected from the roof in the background. Photo by J. W. Coulter.

The grazing lands are widely scattered and transportation facilities to the coast of the island vary with the location. Round-ups are carried on in a fashion similar to those in western United States. During a rodeo an affrighted animal sometimes falls into a crack in the lava and is lost, an accident not likely to occur on the mainland.

Nearly all the cattle marketed are shipped to Honolulu. From some ranches they are driven to the nearest railway loading station and shipped to the Port of Hilo by train. From Hilo they are taken by steamer. From other ranches they are driven to a suitable place on the coast from where they can be taken on board. In many places on Hawaii, a rugged coastline and shallow off-shore water prevent the safe approach of ships, and cattle must be taken out to where steamers are anchored. Loading cattle in such places furnishes much excitement. A cowboy, with lasso around the horns of an animal, hauls it into the surf while another cowboy encourages it behind. A small tug tows eight animals, four on each side, lashed to the tug by their horns, out to the steamer where bands are slipped under them and they are hoisted on board. The animals are very sturdy and seldom are anything the worse for the ducking.

There are thirty-five dairy farms on the island of Hawaii, having a total of 765 cows.[5] Fresh milk is the most important product near the larger centers of population most of which are at or near sea level. Butter and cheese are made at higher elevations. Some

[4] Statistics obtained from U. S. Dept. Agric. Ext. Service, University of Hawaii.
[5] *Ibid.*

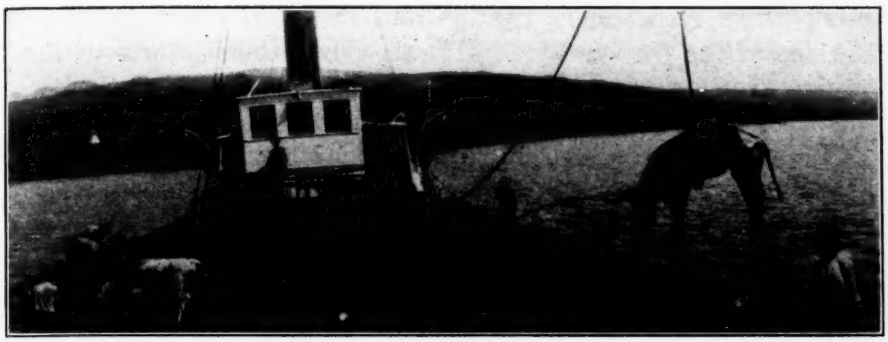

FIG. 6. Loading cattle from the Island of Hawaii. Photo by Honolulu Supply Co.

of the milk and most of the butter and cheese are marketed in Honolulu.

MINOR SOURCES OF REVENUE

Pineapples are not raised extensively on the island. Nearly all of them come from one plantation of about 300 acres in the North Kohala district. There is a cannery on the plantation, and the canned fruit is shipped from a landing at Mahukona to Honolulu, from where it is carried to world markets.

Diversified agriculture is carried on in various locations on the island, depending largely on the availability of suitable land. In some instances, farmers raise a few acres of sugar cane which they sell to the nearest mill or a few tons of pineapples which they sell to the cannery. Three or four sugar companies have rented small parts of plantations to Japanese and Portuguese, who are old hands, so as to encourage them to settle permanently on the land. The rent is paid with a portion of the crop. The raising of bananas is of some importance, and truck crops also grown. The flood plains of a few valleys present picturesque appearances with patchwork patterns of rice and taro fields.[6] Other minor crops include cotton and sisal. The raising of live stock as a phase of general farming is significant in the case of hogs.

The natural environment of Hawaii is suited to a diversity of crops. But the markets for sugar and pineapples only are well organized. The isolation of the island is a handicap to the successful disposal of other products. Diversification of agriculture has been promoted on this island, as on other islands, by the Hawaii

[6] Since this article was written the writer has learned that rice cultivation on the island of Hawaii has ceased.

Agriculture Experiment Station and the Agricultural Extension Service of the University of Hawaii. Thru their efforts methods of rice growing have been improved with consequent lowering of the cost of production and increased yields.

Lumbering is of little importance on Hawaii. There, as on all the islands, forests play an important part in the protection of watersheds. The "koa," or Hawaiian mahogany, is found on well-drained soil on the slopes and ridge-tops. This tree formerly furnished the Hawaiians with the logs from which they made their outrigger canoes. The wood is now used largely for making furniture and ukuleles. The "ohia," a tree abundant in the wet forests, has extremely hard wood and a little of it is cut and used for flooring.

The mountain tops of Hawaii are snow covered during much of the year. The climate at high elevations is not tropical and therefore unsuited to trees of lower altitudes. Successful efforts are being made by the Territorial Board of Agriculture and Forestry to plant coniferous species of forest trees in temperate zone areas.

Fishing is actively carried on in the waters surrounding the island. The industry is largely in the hands of Japanese who ply their trade from "sampans," as their fishing boats are called. Considerable numbers of "aku" and "ono" are taken by hook and line.

The practice of fishing from the shore by throwing a net, originally a Hawaiian custom, is now followed by orientals and others engaged in this industry. The fisherman walks slowly along the beach or stands on a rock peering into the nearby water. When a fish comes within range, he throws the net so that it spreads out in a circle over it. The circumference of the net is weighted and goes to the bottom. When a school of fish approaches the shore, sometimes as many as a score are taken at one throw.

The "opela," or small mackerel, is caught and dried by Hawaiians as a household industry. When schools of these little fish visit the coast, parents and children go fishing for several days at a time.

Tourist Attractions

Not the least attractive aspect of Hawaii is its magnificent scenery and the exhilarating atmosphere of its highlands, attractions for tourists from the world over. The traveller finds his welfare a matter of concern to a hospitable people as much on the

snow-clad peaks of Mauna Loa as on the rim of seething Kilauea. Hawaii National Park is visited annually by 30,000 to 40,000 people. The possibility of seeing a volcanic eruption is a great attraction to those who come to this island. After a period of dormancy of

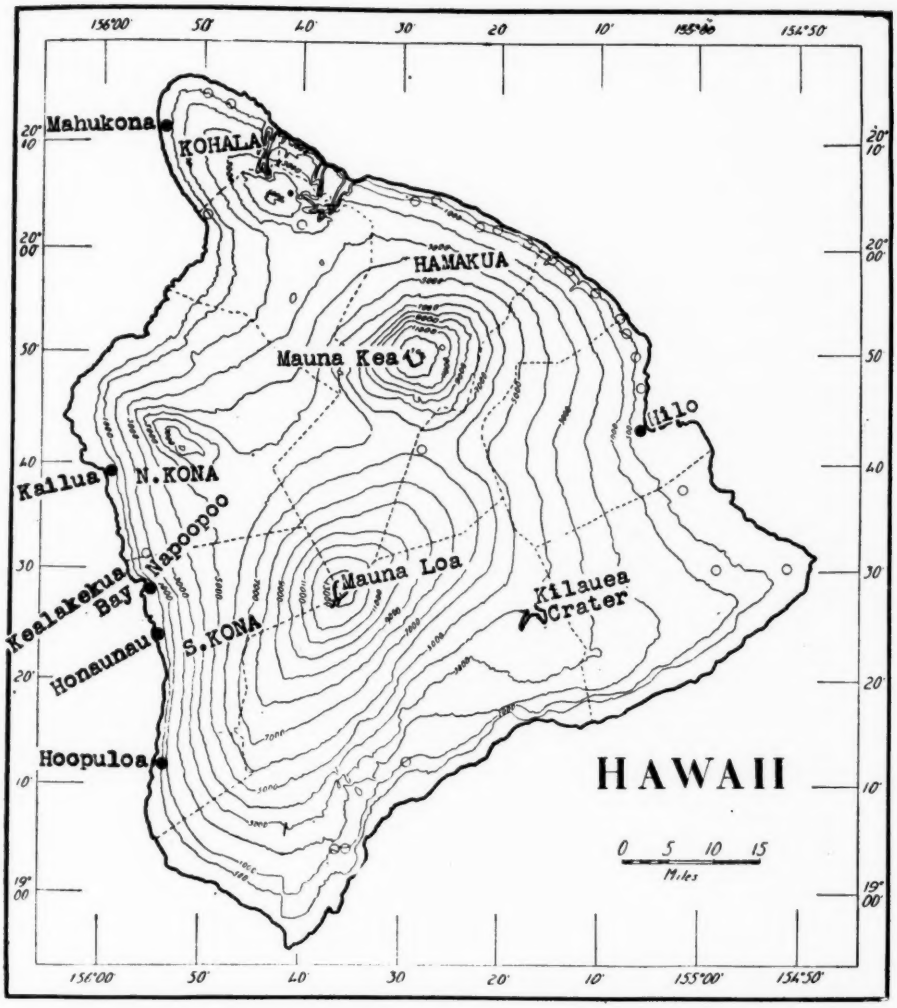

FIG. 7. Base Map. Courtesy Extension Division, University of Hawaii.

seven years, Mauna Loa erupted in the spring of 1926. The flow came from a rift about 5,000 feet below the summit and lasted for nearly two weeks. It crept down the mountain side in a stream 1,500 feet wide and ten to thirty feet deep, engulfing the village of Hoopuloa just before it entered the sea. Eruptive spectacles

like this are enjoyed more by people who own property on the mountain on the opposite side to that down which the lava is flowing than those whose property is being engulfed. These outbreaks, however spectacular and violent, are not dangerous, for there is always an opportunity for onlookers to get to places of safety. Indeed, the breaking out of a volcano on Hawaii is a cause for rejoicing rather than fear. People rush to the scene of the spectacle, and the local tourist business thrives.

In the Kilauea district of Hawaii a visitor finds many places of interest. The "World's Weirdest Walk" leads from the Volcano House to the edge of the crater. It winds thru rich, tropical vegetation, across fantastic lava formations to the pit of Halemaumau. Not far from the Volcano House is a "kipuka,"[7] or oasis, an area of fifty-six acres which has escaped recent lava flows. The decomposition of the surface of the older lava and the incorporation of decayed vegetable matter have made a water-holding soil of great fertility which supports a luxuriant vegetation. Many beautiful and rare native birds haunt this favored spot.

A motor tour around the island is replete with interest. The highways abound with blossoms of the colorful hibiscus, a flower common in the Hawaiian Islands. The combination of tropical woodlands, lofty mountains, deep gulches, and sparkling waterfalls form a scenery of great charm. There are also places of historical interest—Kealakekua Bay, the landing place of Captain Cook in 1779, Kailua, where the first missionaries landed in 1820, and Honaunau, ancient city of refuge.

The greatest appeal to the tourist on this, as on the other islands, is its all-year fitness for outdoor life—hiking, swimming, tennis, golf, hunting, fishing, and surfing on great boards or in outrigger canoes. Hawaii, our nearest island territory to the Pacific Coast, is visited each year by large numbers of people.

[7] "Kipuka" is an Hawaiian word for an island-like area surrounded by one or more lava flows.

STUDY GUIDE FOR THE NITRATE REGIONS OF CHILE

MARIE MCLAUGHLIN
Franklin Junior High School
Aliquippa, Pennsylvania

FOREWORD TO TEACHERS

The introduction to the guide is oral involving a general overview of the life of the people as related to the natural features of their environment. It involves blackboard sketches and diagrams, preferably in color, readings from the references, the display of charts, grafs, and samples of products. In fact, any class procedures that are dynamic are an aid to a successful beginning. The simple question, "What would *you* like to learn about the people of this region?" always brings results. If the major problem does not appear in the children's replies, the teacher may have to word it. Where a child's question is accepted it is written with his name on the list of problems which are in that fashion selected.

CORRELATED ACTIVITIES

A. Art Class. Charcoal sketches or torn paper posters to show typical scenes in northern Chile. Suggestions:
   1. A Section of Country on the Antofagasta and Bolivia Railroad.
   2. A Nitrate Oficina.
   3. Harbor Scenes.
   4. A Typical Copper Smelter in the Andes.

B. English Class. Letters to Pan American Union, Washington, D.C., for booklet on nitrates, for information on any of the foregoing, or for latest reports on the economic or political situation.

C. Mathematics Class. Information to be grafed.
   1. Nitrate production and exportation covering a long period of time.
   2. Temperature and rainfall statistics at various stations.
   3. The significance of various ports.
   4. The significance of nitrate exports as compared with other exports.

A BRIEF OVERVIEW OF THE ECONOMIC SIGNIFICANCE OF THESE MINERALS

Just as many people in the Allegheny plateau depend for a living upon minerals, so people have gone into northern Chile and developed its mineral resources, selling the world nitrates, copper, iron, iodine, and borax. That desert region has the world's only large deposits of nitrates (the chief raw material for explosives and fertilizers), together with mountains of low grade copper ores. At present the iron ore is of little significance in world trade. The iodine is a valuable by-product of the nitrate industry. The extensive borax deposits are of little interest.

Before the World War, the world depended upon Chile for its supply of nitrates. During the war the demand for nitrates was very great indeed. Observe the graf of yearly production to see how the output increased. Germany, cut off from the supply, was forced to manufacture nitrate. Other nations began to make synthetic nitrate, also, and so successful has been such competition that the Chilean people in the nitrate districts are having very "hard times." Are they like or unlike us in that respect? Use this statement of Mr. Whitbeck's by which to compare the local steel industry with the nitrate industry: "When the nitrate oficinas (factories) are busy, Chile prospers; when their activity lags, Chile is depressed." Since 1890, Chile has dropped from an output of over four-fifths to less than one-fifth of the world's supply of the salts. Prices have lowered from over fifty to thirty dollars a ton. The export tax of about ten dollars a ton has been removed. Yet, if all the king's horses and all the king's men get together to aid those two Humpty Dumpties, nitrate and steel, perhaps something can be done for their welfare! In any event, since the United States buys about one-third of the total output, and since we sell some of our manufactures to Chile, we have a common interest in one another's welfare. Furthermore, the people of northern Chile are so increasing their output of copper and iron ore that considerable American capital is now tied up in those interests.

RELATIONSHIPS BETWEEN THE DEVELOPMENT OF THE MINERAL RESOURCES AND THE NATURAL ENVIRONMENT

This overview should be followed by specific assignments to the references. An analysis of the results achieved should bring out various ways in which the development of these mineral resources is related to the natural environment.

The nitrate region is located between latitudes 19° South and 27° South, a distance of about 450 miles in length. This places it in the so-called "Rainless Belt." The region extends from the Coast Range to the high Andes, the deposits occurring in an irregular belt from 5 to 40 miles in width. The deposits in the belt, or nitrate pampa, average about a foot in thickness but may be as thick as fifteen or twenty feet. They lie at altitudes of about 4,000 to 9,000 feet, and may be just below the surface or extending to a distance of twenty-five feet below. The nitrate deposits must be blasted before mining and then concentrated before shipping to the world markets. In the provinces of Tarapaca and Antofagasta the deposits of caliche are richest and most compact, occurring as near to the coast as thirteen miles, whereas in the more southerly provinces the deposits are as far inland as 96 miles. The large copper ore occurs only a hundred miles inland, while the iron mines cially in Atacama. At Chuquicamata a whole mountain of low grade copper ore occurs only a hundred miles inland, while the iron mines are but a few miles inland at Tofo. There are no fuel nor power resources in the area. Due to the shallow waters and lack of breakwaters in the natural harbors all cargoes must be lightered.

What do the statements in the foregoing paragraphs suggest as to the costs of mining and transporting the nitrate? Which are more accessible, the nitrate, copper, or iron ore deposits? Why? What effect does the distance to Europe and to the United States markets have upon costs of Chilean nitrate and copper? What was the effect of the opening of the Panama Canal on transportation routes and costs? Try to learn how they get power to operate the mines and concentrating plants.

Indicate the following locations upon your maps.

1. Parallels 19°S. and 27°S.
2. The Coast Range, or Maritime Cordillera; the high Andes, or Eastern Cordillera
3. The nitrate deposits and the railroads leading to them. Note the relationship between the mineral deposits and the railroads and ports.
   a. The railroads:
      The Longitudinal Railroad of Chile
      The Buenos Aires and Pacific Railroad to Antofagasta
      The Arica-La Paz Railroad
   b. The ports
      Antofagasta, Mejillones, Iquique, Taltal, Cruz Grande
   c. The provinces
      Tarapaca, Antofagasta, Tacna, Arica
   d. Streams
      Rio Loa, the only permanent stream

As the desert about which we are learning exists because of a combination of air and mountain conditions, we shall study the facts of climate and land forms together, rather than regarding each as separate influences. As you may observe, geographic influences are usually felt in combinations of two or more acting together.

Re-read the references concerned with the life of the people in the nitrate towns and ports and also in the copper camps. Re-read the references concerned with the mining and transportation of the minerals. Where an operation in the mining of the minerals, in their manufacture, or in their transportation seems to you to show well the influence of climate observe the relationship. When you have completed your reference reading, select the statement that seems to best show that relationship and and write it in your notebook. Do likewise for the life of the people, making statements relating the following to climate:

1. What they buy.
2. What they sell.
3. The water supply.
4. The homes.

Here are examples of statements showing such relationships.

Due to the lack of rainfall, oil, coal, and the absence of streams, everything that is used in mining operations, even the water for washing the crushed caliche, must be brought from distant sources. There are no cool, grassy parks, nor woods to furnish grazing lands, fuel, mine props, and places for recreation.

If it were not for the extreme dryness of the region, the soluble nitrates would have been washed into the sea long ago. What winds and calm belts affect this region? How are they related to rainfall? What affect, if any, do you think the presence of the Humboldt current and upwelling currents of cold waters along the shore of Chile have on the climate of the region? Relate the direction and height of the mountain ranges to the winds and rainfall. How high are the Andes? Are the summits of the high Andes in these latitudes permanently snow-clad? Relate such snow as does exist to life in the oases. Is the coast foggy? Moisture-laden westerly winds from the Pacific moving towards the land drop their moisture in the zone of colder air which hovers above the current. In winter fogs and low cloud banks are common.

What is the average summer temperature? Winter? As in any hot desert, there is considerable difference between the lowest and highest daily temperatures. What effect would afternoon temperatures well over 100° have upon the length of the working day? Why are the little corrugated iron cabins of the workers often without windows?

Look over the references and write one paragraph that to you best shows the influence of land forms (mountains, harbors, valleys) upon transportation. Write another on the relationship between mining operations and climate. The following is an illustration of such a paragraph.

The Coast Ranges rise so abruptly from the shore that at Caleta Buena, a nitrate port, four railways make a 3000-foot-descent to the shore by means of cables.

The character of the coast line is very significant. Are there deep sheltered bays to serve as ports without the use of lighters? In what months are storms most violent? What features of the land back of the ports make it easy or hard to build railroads to these ports? From where comes the water supply for these towns? Why does a railroad follow the course of the Rio Loa? Can you find any references to any oases in this desert or to the adjoining ones of Argentina? If so, what do they produce, where do they market their produce, and how does the produce get to market?

Political and Economic Aspects

You will note that because of its sale of mineral products Chile has had the money with which to build roads, railroads, schools, etc., in many parts of the Republic. It has also been able to help pay government costs. While Chileans have benefitted greatly from the presence of minerals, the dependence upon that source of wealth has not been an unmixed blessing. The relationships between Chile and its neighbors have not always been so cordial. Note references to the War of the Pacific and to the Tacna-Arica Controversy. What settlements were made?

Do you think the removal of the government tax on nitrate and the improvements that are being made in mining operations and ore concentrations will make the price of Chilean nitrate low enough to compete with synthetic nitrate? Finally, what competition of Chilean nitrate is offered by the ammonia compound manufactured as a by-product of the Aliquippa By-Product Coking Industry? Are any other places in the United States or in Europe (Germany and Russia) making ammonia fertilizers? Do you think the use of fertilizers in the United States will increase? What farmers are the chief users of these fertilizers?

Conclusion

Individual reports based on the questions suggested in the outline as well as similar ones may be oral or written. Class discussions should evaluate the significance of various statements made by the class. These should always bring out fundamental relationships between the people and the environment. Pupils should write paragraphs relating man's activities to natural features of the environment. The following are examples of discussions in which

the "why" of the question is in terms of the natural environment.

1. Why is northern Chile sparsely populated?

2. When nitrates, copper and other minerals are exhausted, will the people move away from northern Chile?

3. Why do travelers prefer to cross the desert by night; the Andes Mountains by day?

4. Why has railroad construction and operation been unusually difficult and costly in northern Chile?

5. Why are articles of food, clothing, and shelter expensive in the nitrate region?

6. How does the cost of fuel add to the costs of production and marketing?

7. Why do people in the nitrate region never pray for rain?

8. Why is the United States interested in the economic development of Chile?

9. Why was Tacna-Arica a "zone of friction" between Chile and its neighbors?

10. Why do various Powers wish to control the world's supply of nitrogen?

VOCABULARY

These are some words that are important for your understanding of the region. If there are others that are used quite often in the guide or in the references, the meaning of which is unknown or doubtful, add those to your list. Ask for help if you need it.

nitrates
nitrogen
iodine
environment
chemist
fertilizer
explosive
product
by-product
soluble
basin
sparse
synthetic
province
mineral
accessible
accessibility
lighter
pampa
caliche
oficina
Tarapaca
scant
arid
summit
Antofagasta
Atacama
Iquique
Tacna-Arica
War of the Pacific
Tacna-Arica Problem
"bone of contention"
"zone of friction"
precipitation

Achievement Test

PART ONE

HUMAN ITEM: In September, 1881, Iquique was in an uproar because it rained for one-half hour! Check the three best reasons why they do not want rain in northern Chile.

( ) 1. Ordinarily, desert climates and mountainous surfaces do not favor man's activities.

( ) 2. Chile is one of the strongest and most progressive nations in South America.

( ) 3. The people of northern Chile do not depend upon grazing or agriculture for a living.

( ) 4. Much of the wealth of the people depends upon deposits of nitrate of soda, which being a soluble salt, would disappear in a moist climate.
( ) 5. Due to the absence of favorable climatic conditions deserts are unproductive of life.
( ) 6. At that time, nearly half of the revenue supporting the Chilean government came from the export tax on nitrates.
( ) 7. Rainstorms on the desert are very destructive to life and property.

PART TWO

Match second column with first, using each letter but once.

1. 4000 to 9000	( )	A. name of low latitude desert
2. nitrate of soda	( )	B. latitude of "Rainless Coast," in degrees
3. Antofagasta	( )	C. by-product of nitrate industry
4. Arica	( )	D. product of Trapaca province
5. 17 S. to 30 S.	( )	E. native name for raw nitrate of soda
6. Atacama	( )	F. altitude of nitrate deposits, in feet
7. iodine	( )	G. very dry region of air
8. caliche	( )	H. port connected by railroad with La Paz, Bolivia
9. great copper deposits	( )	I. sending port for nitrates, copper and tin
10. tropical calms	( )	J. province of Atacama

PART THREE

After the Roman numeral mark the capital letter which designates the paragraph in the second column that matches the paragraph marked by the numeral.

Geographic Influences

I. ( )
In the nitrate region earthquakes are frequent, and at times cause tidal waves which are marked by a great rising of the ocean waters which sweep in toward the land.

II. ( )
The country is hot. It never rains here, the dust blows everywhere and penetrates every corner.

III. ( )
The slopes are steep and the passes high, seldom below 10,000 feet above sea level. In any mountains of low latitude deserts, there are great extremes of heat and cold. Electrical storms are intense and frequent.

Human Items or Activity Effects

A.
We do not see a green thing—a tree or shrub or even a blade of grass. There are no fertile gardens, no verdant trees, no life giving canals, no sign of agriculture. Our eyes and throats are constantly irritated and our food is loaded with sand. The houses are little corrugated iron cabins often without a single window.

B.
Both mules and trucks have a hard time crossing the *salares.* In one mile of travel upon a difficult *salar,* a traveller once counted sixty shoes torn from the feet of passing mules.

C.
In the ruined zone the charred red and blackened façades of the buildings faintly outline the cluttered streets. . . . Disorder among the people prevails, the food supply is destroyed, and there is poverty and misery. In the harbors ships are broken up. Months pass before business and order are restored.

IV. ( )

In the nitrate regions great beds of salts occur in what were once the basins of ancient lakes. Naked as bare rocks these depressions are dread spots in the desert.

V. ( )

The coast range rises abruptly from the shore. Desert streams, carrying tools in the form of coarse gravels and sands, have cut deep ravines into the bluff.

D.

Here ties shrivel up and there is constant danger of fire. Mankind experiences every degree of discomfort from the heat of the tropical to the cold of the frigid zones. Mountain sickness is common.

E.

At Pisagua, Antofagasta, and Tocopilla, the railroads make steep descents. For miles there is scarcely more than a few hundred yards of straight track in a single stretch. The grade is so steep that it requires several hours to make the ascent with two engines and a short train.

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A PLAN FOR THE CORRELATION AND ARTICULATION OF GEOGRAPHY, HISTORY, AND CIVICS IN THE JUNIOR HIGH SCHOOL

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PRESENT CONFUSION IN JUNIOR HIGH SCHOOL GEOGRAPHY

Geography, as has been pointed out by Brigham[2] is, "Strong in the university, lively if not always wise in the grades but restricted in the high school." An even cursory examination of junior high school geography today, however, will reveal the fact that it is not only restricted but actually in a state of confusion. Numerous factors have contributed to this confusion. A changed civilization, according to Kirkpatric[8] has made necessary a re-adjustment in secondary education. The 6-3-3 organization is replacing the old 8-4 plan. One cycle organization in elementary geography has been replacing the old two cycle course. Educational philosophers have re-defined the aims of education. Curriculum revision with a view to establishing a social science sequence has been undertaken. Educators, following the leadership of no less an authority than John Dewey,[3] who writes that "geography, when the ties with history are broken, presents itself as a hodge-podge, a rag bag, etc." have in numerous cases abandoned geography and history as separate branches, and substituted project syllabi. There has been little or no uniformity of aim in this curriculum revision. Moreover, specialists in subject matter have largely been ignored in curriculum revision, and geographers, when consulted, have not always agreed as to the proper objects and limits of their field.

Clarification of the present confused situation in which junior high school geography now finds itself will not be possible until a more general agreement is reached on the following more or less controversial questions: (a) Should geography be grouped with the natural or social sciences? (b) Should geography be preserved as a separate branch in the junior high school curriculum? (c) Should there be a definite organized curricular content in the junior high school and how should this content be correlated and articulated? Educators and geographers must face these questions and if possible arrive at a common understanding.

SHOULD GEOGRAPHY BE GROUPED WITH THE NATURAL OR THE SOCIAL SCIENCES?

There has appeared both in the university and the secondary schools in recent years a tendency to make a rather sharp distinction between the natural and the social science fields. The basis for this departure appears to be largely administrative, however, it is a logical distinction and will doubtless persist as the social sciences develop their respective domains. Geography, however, is neither purely a natural science, or purely a social science. It is both a natural and a social science. Human and cultural geography quite certainly belong to the social science administrative division while physical geography has been traditionally in the natural science group where it has recognized and respected scientific standing. Hence, unless there are to be three groups the geographer is placed in a dilemma. A dismemberment of geography is unacceptable to the geographer. Moreover, it is undesirable from the standpoint of the administrator since it makes necessary a duplication of equipment, and reduces, particularly in the smaller schools, the possibility of employing specially trained full time geography teachers. Isolation of physical geography also encourages an already too prevalent tendency, particularly under the stress of faculty change, to assign the work in physical geography to a teacher trained only in physics, chemistry, biology, or even physical education. Such a procedure is obviously detrimental to geography, to the pupils, and to education.

In recent years, both in Anglo-American and continental countries, geography has become increasingly dominated by the human and cultural viewpoints. Geographers even when working in physical geography have a definite human orientation and motive. Geography, moreover, makes perhaps its greatest contribution to education thru the background it gives for the social studies and for the interpretation of history. Hence if, for administrative or curricular reasons, it becomes necessary to draw a sharp line of distinction between the natural and the social groups of sciences, geography teachers should welcome, at least at the junior high school level, the assignment of geography to the social science group and wholeheartedly join with school administrators and curriculum builders in the task of formulating the best possible social science curriculum. They must, however, never lose sight

of the fact that all serious human geography is based upon physical geography.

SHOULD GEOGRAPHY BE PRESERVED AS A SEPARATE BRANCH IN THE JUNIOR HIGH SCHOOL?

An influential group of educators according to Conner[5] holds that the separate social science branches should be abandoned in the junior high school and that a unified social science curriculum should be organized around pressing social needs. The theory is that: "We should decide as best we can as to what social values we now possess and need to be preserved and as to what social deficiencies we need to take up and that we should select from the field of social studies for use in the secondary schools those materials that tend to bear directly on the presentation of the first set of values and the creation or spread of the second."[4] That, in short, education is a matter of directly "indoctrinating" the pupils with the attitudes a "good citizen" should possess. The weakness of this position has been pointed out by Ellis,[5] who notes that the duties of future world citizenship are so numerous and indefinite that the best preparation for them is not thru "indoctrination" but thru the understanding of the society in which they now live and with the knowledge and the ideals that normally grow out of such understanding. Moreover, "to conceive of citizenship training as indoctrination no matter how broadly considered is to train citizens for a static society and to hamper future adjustment in a changing civilization."

Brigham[2] has commented on this movement as follows: "There is much cheap talk about making citizens. Much is pedagogical froth. Speaking as one who regards good citizenship as the hope of the world, I still fear that driven by syllabi and put upon by school authorities by mechanical compulsion, teachers will so continually and so articifically emphasize citizenship as to make the idea a bore to children." The criticism, however, is not with the citizenship objective but with the direct approach. Our ideal citizen, like the oak tree, must be deeply grounded. He cannot be produced by hot-house methods.

The movement to replace the separate social sciences in the junior high school by a unified "social science" course has considerable momentum. Textbooks written with this object in view are

now in use in the public schools. One of them, however, as is pointed out by Selke[14] contains exceedingly strained and far fetched efforts to correlate unrelated portions of history and geography and presents "an alternation of geography and history which makes it difficult to remember time relations in history and regional relations of geography." This movement for unification has also been accompanied by a mania for project curriculum building. Subject matter long established and developed by slow processes of evolution and selection has been lightly set aside for a program of project curriculum formulation. These programs too often have been instituted by ambitious superintendents lacking both library facilities and proper objectives for so great an undertaking, while the actual work of project formulation has been forced upon committees of teachers possessing neither the time nor adequate scientific background for the task. Teachers and pupils alike have been innocent sufferers. The outstanding result of these efforts to date appears to have been confusion rather than fusion of subject matter.

While we may perhaps agree with Nutt[12] that the courses in the secondary school have tended to become too theoretical yet we must agree with Brigham[2] that "we have got to be subject minded" and that to fuse the subjects in elementary teaching is to "wander in the quagmires of confusion, with partial and incompetent teaching, gross omissions and hazy results." Limitations of the human mind make it impossible to study things in general. The viewpoints and systematic methods of the various sciences are essential to analysis and generalization and hence simplification of complex social phenomena. May we not well with Jefferies[7] question the wisdom of subjecting pupils of junior high school age to such a complexity as a social science project? The objective sought according to Collings[3] is purposeful activity, however, as Jefferies points out, purposeful activity must be preceded by definite thinking which presupposes definite knowledge. The efficacy of the project curriculum as a means of providing this definite knowledge may well be questioned.

It is doubtless true that the degree of specialization desirable and necessary at the junior high school level is less than in the university or senior high school. The simultaneous pursuit of too large a number of branches according to Cook[4] scatters attention, develops flabbiness and a desire for novelty which will send pupils

to the senior high school unprepared for the severe regimen that there awaits them. However, educational progress, like scientific and economic progress, depends upon the division of labor. And the organized knowledge and the various viewpoints which the student will acquire from his teacher of geography, history, and civics will give him perspective and be of value to him in analyzing and forming mature unprejudiced conclusions on international and social questions as they arise when he has left school.

A CONTENT OBJECTIVE NECESSARY

If the special values of the different social sciences are to be preserved and at the same time tangential tendencies and omissions are to be avoided there must be a unifying content objective for all social science work of the junior high school. This objective must be in conformity with the cardinal principle of social education which has been formulated by the National Educational Association as follows:[13] "To develop the common ideals of thought, feeling, and action whereby America thru a rich unified common life may render her truest service to the world seeking democracy among men." In brief the objective to be sought is training for world citizenship which doubtless will be most nearly realized by equipping the student with as good an understanding of modern civilization as he is able to master. This understanding must not be superficial but must include (1) a knowledge of the geographic background in which world civilizations have evolved, including knowledge of the natural regions and resources and their utilization, commerce and population distribution, (2) a history of world civilization, and (3) a study of the most important political and social problems now confronting civilization. The realization of this major objective will require a comprehensive plan, for the correlation and articulation of subject matter, which will eliminate duplication, and relieve the student from the simultaneous pursuit of too large a number of subjects.

A PLAN OF CORRELATION AND ARTICULATION PROPOSED

If the foregoing conclusions are warranted, we may proceed with some assurance and definiteness to the task of reorganizing the junior high school curriculum in the social studies. The following curriculum outline centering around world civilization is proposed as a possible solution.

World Civilization
- A. Old World Civilization
  1. 7a—Geography of the Old World
  2. 7b—History of Old World Civilizations
  3. 8a—Civics. Political, economic, and social problems of the Old World
- B. New World Civilization
  1. 8b—Geography of the New World
  2. 9a—History of New World Civilizations
  3. 9b—Civics. Political, economic, and social problems of the New World

This division of the study of civilization into old world civilization and new world civilization rests upon fundamental considerations. Each hemisphere presents a zonal cross section of different latitudes, climates, vegetations, and a wide range of cultures in various stages of advancement. The basic plant and animal resources upon which the earliest civilization of the two hemispheres depended were distinct. Merrill[12] writes as follows on this point, "It is a curious and incontrovertible fact that previous to 1492 not a single cultivated food plant or a single domesticated animal, except the dog, was common to both hemispheres. This means that agriculture was developed independently by primitive man in America and strictly on the basis of American plants and animals and that the early American civilizations were developed independently by primitive man in America and strictly on the basis of American plants and animals and that the early American civilizations were developed on the basis of this agriculture. It has only been within the past five centuries that there has been a general world wide dissemination of basic food plants and domesticated animals." The political and social problems and outlook of the two hemispheres also is far from identical as is witnessed by the persistence of a Monroe Doctrine and the attitude of United States toward the World Court. Mackinder[9] in his book "Democratic Ideals and Reality," foresees the possibility of land forces establishing military and political hegemony in the "World Island" which includes Europe, Asia and Africa.

The study of old world civilization is placed first because our new world culture has largely been borrowed from the old and hence knowledge acquired in the first half of the junior high school course will serve as a background for the study of Ameri-

can civilization which, moreover, because of its greater importance to us must be more thoro and detailed and hence demands greater maturity on the part of the pupils. The threefold division of the work on each unit with geography first followed by history and then civics, including economic and social problems, has much to commend it. The student's program is simplified and it becomes possible to organize sufficiently large units of subject matter from a combined scientific and educational viewpoint. Moreover, the first unit, geography, will provide a necessary background for the history and civics units. History, likewise, along with geography will provide a background of definite information which is necessary for the fruitful consideration of the more controversial questions which will arise in the last unit dealing with present day civics and social problems.

The execution of the plan herein outlined will require the cooperation of junior high school teachers, professional educators and specialists in subject matter, also, much experimentation by the trial and error method. It will apparently also be necessary to forsake the leadership, both of these specialists in education who are advocating a "fusion course" in "social science" and those who insist upon the project method, or any other single method of teaching and to look for guidance to such educational thinkers as Bagley[1] who writes as follows: "Good teaching procedures in my judgment must grow out of the subject matter to be taught rather than deduced from theoretical postulates and injected into subject matter by specialists in education."

Until the plan of correlation and articulation of geography, history and civics herein outlined or some similar plan is in operation in the junior high schools, geography cannot escape from the restrictions and confusion in which it now finds itself. On the other hand, when we have this or some better plan in operation, and special geography rooms, maps, books, journals and equipment provided, and syllabi and textbooks revised to conform to the plan and objective and, last and most important, have teachers professionally trained for the specific work in hand so that the work may be kept abreast of the times, then and only then, will geography accomplish its educational mission in the junior high school. The quality of the work would be improved and pupils would be better prepared than at present for the senior high school or if his scholastic career is terminated, for shouldering the responsibilities of

world citizenship. In fact, may we not raise the question as to whether or not the common background of knowledge such as would come from the universal adoption of a common plan of studying world civilization is not essential to international solidarity, the preservation of world peace and the continued advancement of world civilization?

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GEOGRAPHY IN RELATION TO BUSINESS

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INTRODUCTION

What is meant by the term "Business"? A dictionary definition reads somewhat as follows: "that which busies or occupies one's time, attention; that which one does for a livelihood; occupation; employment."

If we consider business in its broadest sense we must think of all the multitudinous ways in which people work to make a living. We should not limit our consideration to localities or even countries, but should include the world at large since world conditions make themselves felt almost everywhere.

Some forms of business seem to affect the welfare of only a few individuals intimately connected with them, while others affect large numbers both directly and indirectly. Some are world-wide in their scope and others are purely local ventures. The success or failure of all these various economic activities reacts upon the whole economic system. In periods of depression all industries are affected and lack of prosperity in one field reacts on all the others. Even in times which seem unusually propitious, business ventures come to grief.

As individuals our field of interest is limited. Normally the producer has insufficient time and training to view his own particular industry in all its aspects, and it is only in the realms of "big business" that this can be done. Loss of profits, capital, prestige, and for the larger proportion of mankind, loss of employment, may lead to serious conjecture as to the causes contributing to the lack of success in a particular undertaking. Criticism is likely to be confined to the human factor. But, is that all? Local conditions alone are not always the cause of success or failure. Modern industry has local, regional, national, and international aspects, all of which play their part in its development in a given area. The present depression in industry illustrates this principle all too clearly. A clear understanding of local, regional, and world conditions as they affect a particular industry, and the provision of satisfactory adjustments to overcome local and regional handicaps are essentials

for the successful operation of industry. To know thoroly all the advantages and handicaps of a given area is the first essential for successful industrial development, and the natural environment in relation to human activities cannot be analysed more effectively than thru geography.

MODERN GEOGRAPHY

What is modern geography? What are geographers doing? What has the geographer to contribute which is of service to the business man? Can geography aid in the organization and development of industry? These are some of the questions that we may ask ourselves at this juncture.

In recent times there has been a marked change in geographic philosophy and teaching. The subject has taken on a much more practical aspect since now it is primarily concerned with human beings and their activities in relation to earth conditions. The main functions of geographic teaching at present is to describe and explain the relations between man and his natural environment. It treats the world as the home of man and analyses the elements which make up the natural environment primarily from that point of view. It examines and interprets the adjustments which social groups have made and are making in order to utilize to best advantage the natural resources of the regions in which they live and of the world as a whole. It seeks to explain why men use the land and its resources as they do. It attempts to evaluate earth resources in terms of their actual present use to man. It analyzes the causes for the different ways in which people work, live, and play in different parts of the world. It is interested not only in purely local relationships but in world relationships, so that the student of geography becomes a world citizen and is able to look at local affairs from a much broader point of view. He studies the advantages and disadvantages, the opportunities and handicaps of particular regions and seeks to point the way along which development should be directed to give the best results. By successful adjustment to a particular combination of natural environmental conditions in a given area the most suitable types of activities may be selected, and industry is more likely to succeed than if a maladjustment is made. Knowing exactly what the environmental conditions in a given area are, it is possible to indicate in advance the

lines along which development should take place to give the best results to the individual, the community, and to the world. To quote Jean Bruhnes:

> Because man lives upon the earth, he depends upon the earth. No one recognizes more than we the part played by human activity. Certainly all is far from being explained by natural facts alone. . . . The essential thing for men is then to know exactly the real nature of the natural conditions which surround their lives and to know always with what precise geographical facts they will have to cope. The genius of humanity adapts itself with rare versatility to the most dissimilar facts. . . . Everything on the surface of the globe is for men a matter of habit, of sound understanding of physical facts, and of skillful adaptation to these facts. Moreover, the adaptation must take place promptly and at the right time—preceded, prepared for, and brought about by exact scientific investigations.

To quote another well-known geographer, H. H. Barrows:

> The student of geography comes to recognize the various modes of life followed in different parts of the world as natural corollaries of contrasted environmental conditions. He appreciates the utility of contrasted environments in producing the multifarious materials used in current civilized life, and at the same time he realizes the economic problems which have been and must be overcome in order to utilize these materials. He gains a sympathetic insight into the lives of people who inhabit lands unlike his own, and thereby broadens his social outlook. He perceives that the political organization of the world today is closely related to present or past adjustments to environment, and in measure with this perception he becomes . . . a citizen of the world. . . . He should appreciate the interdependence of the inhabitants of varied regions in different parts of the world and should realize that through improved means of transportation and communication the environment affecting each group of civilized people has come to embrace practically the entire earth. An appreciation of the interdependence of man and of the unity of the earth will help the student to become an intelligent citizen of the world.

Geography may be classified under six main phases: (1) Economic Geography, (2) Political Geography, (3) Social Geography, (4) Historical Geography, (5) Racial Geography, and (6) Regional Geography, all of which are more or less intimately related.

Since the business man is primarily interested in the ways by which people make a living, in the production and utilization of earth resources, in the provision of utilities and services developed to facilitate production and distribution, in the localization of specialized industry, in land utilization, in trade, local, national, and international, in present day social and economic conditions thruout the world, in the investment and employment of capital, in the effective utilization of labor, economic geography has the greater practical value to him since it is primarily concerned with

all these phases of human activity. It deals with present day conditions and attempts to point the way towards a more effective utilization of earth resources. The objectives of economic geography are well illustrated in the following excerpts from the catalog of a well-known university: "A world-wide survey of the distribution and characteristics of major economic pursuits in so far as they are related to the natural environment." Or again, "A survey of the principal activities in each of the major geographic regions of North America from the standpoint of their relation to the natural environmental complex. Emphasis is placed on the regional equipment for industry in the several divisions of the continent."

GEOGRAPHY IN RELATION TO BUSINESS

What is some of the specific information which geography can bring to the business world?

By far the greater proportion of mankind makes a living in one of the following ways:

1. *By primary production,* that is, by raising agricultural products or by exploiting those resources provided by nature such as lumber, minerals, and fisheries.

2. *By secondary production,* or manufacturing processes, where raw materials are assembled at points convenient for their conversion into less bulky but more useful and more valuable products.

3. *By trade and commerce,* the media thru which (a) surplus products from one area are distributed to areas having a deficiency in those things, (b) raw materials are assembled in those regions equipped to utilize them effectively, and (c) manufactured products are distributed locally, nationally and internationally.

4. *By transportation,* by means of which the multifarious products of different climes are made accessible to those regions needing them, and without which the full use of the productive areas of the world could not be made.

5. *By services,* which have been developed to facilitate exchange, human intercourse and activities, which the producer of commodities cannot organize and operate himself.

To many, the term "business" connotes manufacturing and all those activities associated with the production and sale of fabricated products. It should be remembered, however, that all forms of

primary production play their part in the business world, that primary production is distinctly related to manufacturing, and that both are related to transportation and commerce.

Agriculture is the most fundamental of all the primary industries since it represents the most permanent form of land utilization. It furnishes not only food but also raw materials for manufacture, and provides employment directly or indirectly to a large proportion of the world's population. Obviously, all crops cannot be produced equally well in every part of the world. In a study of a crop, wheat, for example, the geographer is concerned with noting the major producing areas, the comparative significance of each, the natural environmental conditions which are most favorable for this crop, the conditions under which it is raised in each area, the adjustments that have been made in order to extend its cultivation in less favorable regions, the possibilities and need for further extension, the movement of the commodity in international trade, the effectiveness of marketing facilities and organization, the trends in production and consumption in relation to supply and demand and the fundamental conditions affecting these.

A more definite knowledge of these data by all those concerned with the production and marketing of crops would aid in preventing serious over-production and under-production, would tend to restrict production to those parts of the world most suitable for each type, and would facilitate the introduction of improvements in the methods of both production and distribution.

Changed economic conditions may call for the production of a commodity, rubber, for example, in some new area. Thru the medium of geography, exact data regarding the climatic and other requirements of rubber, the areas best suited to its production, and many of the problems which will have to be met in the new area, will be available. Such information prepares the grower in advance for the problems and conditions he will have to face.

In evaluating the agricultural possibilities of a region a knowledge of the following information which is largely geographic in character would be helpful in shaping its future development:

1. The location, extent, and present utilization of land already in farms.

2. The environmental conditions within these districts in respect to climate, soils, water supply, transportation facilities, acces-

sibility to markets, the nature of the crops best suited to the individual areas, and the characteristics of the present population.

3. Local conditions which would help its development.

4. Conditions which would hamper development and the extent to which they could be overcome.

5. The location, extent, character, and possible utilization of land unfitted for tillage.

From such information it would be possible to draw accurate conclusions as to the agricultural possibilities under existing economic conditions, the lines along which development should be directed, the possibilities for specialized industries, and the adjustments necessary to remove or minimize existing handicaps. Such information would be valuable to all concerned with industry and favor sane development.

In a similar way, geography has much to offer to those interested in the "extractive industries" such as mining, lumbering, and fishing. Except in the case of mining, the foregoing, by scientific exploitation, can remain a permanent natural resource. Minerals once extracted cannot be replaced. The non-use of these types of resources is due in most cases to definite environmental handicaps which make exploitation unprofitable, handicaps with which the student of geography is cognizant. From the number of people who make unsound investments in mining schemes it is clear that a knowledge of certain fundamental geographic principles associated with the exploitation of a given mineral resource is either lacking or discounted. It would seem natural that anyone contemplating the development of a mining property should know (1) the amount and quality of the deposit, (2) its depth below the surface and the nature of the overburden, (3) mining conditions, (4) the character and accessibility of the region in which it is located, (5) its location with reference to markets, (6) existing transportation facilities, (7) cost of production in relation to price, (8) the demand for the particular commodity. It is from these aspects that the geographer gauges the utility of a mineral resource.

The appraisal of forest lands and potential or existing lumber industries is made in a similar manner.

Successful manufacturing and commercial development also represents a satisfactory adjustment to natural environmental conditions.

Geography considers the distribution of manufacturing indus-

tries thruout the world as well as from purely local points of view. It evaluates the bases upon which this phase of human activity has developed. Altho simple forms of manufacture are possible wherever man exists, modern conditions with complex processes have led to the concentration of manufacturing in definite areas where the environmental complex is favorable to specific groups of industries.

In addition, there are other centers which possess potentialities which may be realized and still others whose development needs readjustment to meet changing conditions. In both these cases local business people are especially interested since the outcome will radically affect the prosperity of the community as a whole.

Problems of world production, of supply and demand, and of world markets are matters closely related to economic geography and constitute important phases of investigation.

The localization of manufacturing in a given area is dependent upon location with reference to (1) adequate supplies of raw materials, fuel or power, labor, and capital, and (2) adequate transportation facilities and markets. In general, manufacturing tends to be concentrated in populous urban areas which have developed in keeping with the industrial prosperity in their midst.

In an analysis of the manufacturing industries of a given area, the function of geography is to explain their development in relation to the environmental complex. The geographer is interested in knowing the degree to which existing industries represent successful adjustments to the environmental complex, what conditions have favored the development of specific industries and of manufacturing in general, what particular handicaps exist and how these have been met, the possibilities for the expansion of existing industries and for the development of new ones, and the amount of land suitable for and available for the types of industries likely to develop there. This is exactly what the business man wants to know.

In one large city in the United States, the business leaders combined to finance a commission to make a careful study of the industrial possibilities of the city. Several geographers were employed on this commission to investigate a number of industries in order to determine if they could be carried on there profitably. The results of their work have proved of considerable value and have been well received.

In some centers where existing industries show definite signs of decay, new industries are needed to replace them. At Scranton, where the reserves of anthracite coal are approaching exhaustion, the business men have been long concerned with finding suitable substitutes. The introduction of the silk industry has proved a very successful readjustment to their particular conditions. Many other cities which were formerly prosperous business communities have reached desperate straits as they have been unable to make satisfactory readjustments. Their efforts have had no sound geographic basis.

Another important service which geography can render to the business community is in regional planning, since effective land utilization is one of its major objectives. A comprehensive analysis of the geographic conditions would reveal the essential needs of the community, the possibilities of improving and enlarging its transportation facilities and other services, the character and culture of its people, the possible and probable lines of future development and the particular requirements in land of each phase of urban life. A scheme devised along these lines would ensure an orderly plan for progressive development which so many cities lack.

With accurate knowledge along the lines indicated above, those concerned with the organization of production and distribution and the services necessary to ensure their smooth operation in the utilization of earth resources would be in a much better position to make necessary adjustments to facilitate production and distribution. Business conditions would be much more stable and prosperity more general.

A GEOGRAPHIC (HUMAN-USE) CLASSIFICATION OF MOUNTAINS

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The problem of the geologist in classifying land forms is relatively simple as compared with the problem with which the geographer is confronted. The geologist's approach is naturally enough from the genetic point of view. Mountains, rivers, plains, islands or coasts all fall naturally into form-of-origin groups. The geographer must confess to only a partial interest in a genetic point of view. He realizes that his attitude must be that of the man who lives in and uses the mountain. The mountaineer is quickly appreciative of the types of economies arising from differing physical conditions but he understands little of geologic origins and his interests in the origins is abstract. He unconsciously classifies mountains from the human-use standpoint and the geographer, perforce, must do likewise.

Let us be more concrete. The environmentalist is not greatly concerned whether an asymetrical range isolated on a plain is a block fault mountain with an eroded fault-scarp face or whether it is a cuesta with one normal steep slope developed in a cycle of stream erosion. The topography of the two ranges may be essentially identical, as well as the human responses. In a geographical treatise there can be little excuse for differentiating them. This does not argue that the geographer should not be well trained in geology and historical morphology. But the fact remains that human geography begins with the forms of environment as they are.

What are the several forms of mountains? How simply may we classify them? We have been too general and our literature scarcely indicates the various topographical forms. We must not go to the other extreme and become too detailed and technical lest the general reader throw up his hands in despair. If indeed we were to study regional geography of mountains we would need go into elaborate detail. The classification which follows is not in the detail of a study of regions. It has simplicity, perhaps even at the expense of certain accuracy. This would be true of all simple classifications of land forms.

It will be noted that in the classification the chief divisions are

based upon relief in its more general aspect. The primary subdivisions (Arabic numerals) are founded upon details of relief and geologic structure. The secondary subdivisions (small letters) are climatic. A set of tertiary subdivisions is based upon greater detail of climate.

A GEOGRAPHIC (HUMAN-USE) CLASSIFICATION OF MOUNTAINS[1]

A. Isolated Peaks of Groups
   a. Moisture oases
   b. Favorably cool
   c. Too cool

B. Isolated Ranges or Range Groups
   1. Single ranges
   2. Parallel series
   3. Lofty barriers without passes
   4. Lofty barriers with passes

under 3 and 4	a. East-West ranges	i.	sunny side
		ii.	shady side
	b. North-South ranges	i.	moist side
		ii.	dry side

C. Mountain Areas of Considerable Size
   1. Low domes of sedimentary rocks
   2. Low crystalline massifs
   3. Alpine crystalline massif
      a. of low latitudes
      b. of middle latitudes
   4. Prealpine sedimentary mountains glaciated
   5. Prealpine sedimentary mountains unglaciated
   6. Subdued old-age groups

Isolated Peaks or Groups. Isolated masses have a set of relations with lowlands which differentiates them from large mountainous areas. Moreover zoning of life forms are much more nearly regular there than on flanks of ranges or in large mountainous areas. The element of exposure is much less defined on an isolated peak than on a range of mountains. Most of these isolated eminences are volcanic cones with a characteristic geology and a familiar human response. The San Francisco Peaks of Arizona are a moisture oasis, rising as they do from a desert, but supporting heavy forests. Mt. Etna is much more moist than the irrigated Sicilian lemon groves at the base. Zones on this peak are more nearly perfect than are usually found. The Hawaiian Group is another example. An example of a peak which is favorably cool in distinction to the lowlands is Mt. Kilimanjaro in Kenya Land. Once again altitudinal

[1] Certain fundamentals of this classification are the work of Professor C. Moses of Muskingum College, prepared for me in seminar.

zones of life forms are remarkably sharp. For isolated peaks that are too cool we do well to look for higher latitudes. Mt. Rainier of Washington is a good illustration.

Isolated Range or Range Groups. There are innumerable examples of single ranges. In Eastern Bolivia there is a fold range nearly one hundred miles in length. The Vosges are an example of a block fault range in a moist region while the ranges of the Basin and Range Province of Nevada are examples in an arid region. For parallel ranges we have the familiar cases of the Jura of France and the Alleghenies of Pennsylvania. The reasons for distinguishing between lofty barriers without adequate passes (Himalayas) and those which have passes (Alps) is obvious enough. In the first case there is much more distinction between the social life of the two slopes than in the second case. Lofty barriers must in either case be treated according to the compass direction of their trend. Those barriers which run east and west, tho they may have a wet and a dry side, have the greater distinction between their flanks due to insolation and the higher the latitude the greater the difference. Those ranges running north and south, whether in trade wind or westerly wind, will have contrasted wet and dry slopes. This tertiary set of subdivisions brings one essentially to the study of mountain regions rather than a classification of mountains.

Mountain Areas of Considerable Size. Such imply considerable geologic and topographic complexity. Whereas a large area due to volcanic uplift and intrusion thru sedimentary beds, accompanied by faulting and overthrust, is genetically one problem, the geographer sees in such a region a number of contrasted mountain types having as many environmental provincialisms. For the sake of simplicity here we differentiate only between the crystalline massif and the fringing sedimentaries. Any student of the Alps must recognize quickly the difference between the central massifs and the pre-alps. The word "alpine" in the classification is used to designate those mountains which have been distinctly glaciated; having corridor valleys, hanging valleys and alp meadows.

A low dome of sedimentary rocks is illustrated by the Henry Mountains of Utah. A low crystalline massif is found in the core of the Black Hills of South Dakota. Alpine crystalline massifs are so lofty that they must be divided into those of low latitudes and those of middle or higher latitudes. This is because the height limits

of life forms differ so greatly on the two. The Alps of Ruwenzori in Urundi have huge trees at 12,000 feet (Mt. Baker) whereas the massifs of Europe have a dwindling forest at 7000 feet. Prealpine sedimentaries that are glaciated are illustrated by the mountains of Savoy and those which are unglaciated by the Alpes Maritimes. Subdued old-age groups are found in the mountains about Asheville, North Carolina, or the mountains of northern New England.

There is an obvious difficulty that certain mountains or groups may be placed in two or more of the divisions of the classification. This is unavoidable. There is, nevertheless, a virtue in even so general a classification. The more complex the subject the greater the need for some form of simplification. Such a simplification is a point of departure from which to enter upon an understanding of the complexities.

ALBERT PERRY BRIGHAM

W. M. DAVIS

Albert Perry Brigham, Professor of Geology at Colgate University in central New York, held a leading place in the small body of American Geographers who won for their science the more scholarly position it now enjoys in some of our schools and in many of our colleges. There were two periods in his life which merit special attention because they mark important steps in his progress toward the high position which he eventually held. The first period was of relatively short duration in his early maturity: it was marked by a change of heart which led him to give up the Ministry for Geology. The second period was of longer duration: it was marked by a change of mind which gradually transformed him thru his later years from a Geologist into a Geographer.

The first change was well advanced when, after studying by himself while still a preacher the geology of his home county, Oneida, he attended a Harvard Summer School of Geology; it was completed two years later when he resigned his pastorate in Utica and spent a year in graduate study at Harvard, for he then returned to his alma mater as Professor of Geology. No record of the causes of this change is available; and that is to be regretted, because when a man of Brigham's sincerity and candor discovers that, after nine years of preaching, he had better not in the era of rapidly growing rationalism remain in the immediate service of the church in which he was reared, one may suspect that he found its tenets, brought down from generations of less rationalism, too narrow for his widening vision of the world. A clear statement of the manner in which he made this discovery and of the reasons which led him to act upon it as he did might be helpful to many others who, similarly circumstanced, have less clarity of thought and less courage of action than he had.

Concerning the second and more gradual change there is fuller knowledge. It began unconsciously in that year at Harvard when he and his teachers supposed he was fitting himself to teach the less human aspects of earth science; a happy year in which he, more mature than his fellow students, and his professors became lifelong friends. The change must have been fundamentally favored by the interest in mankind which had earlier led him into the ministry; and it must have been actively promoted by the simpler aspects of geological history and the highly significant aspects of geographical history which characterize the Mohawk Valley where his teaching began and continued for over 30 years. If he had been placed a hundred miles farther north, in the Adirondacks, he might never have extricated himself from the inhuman intricacies of the petrographic problems that would have there engulfed him. Altho his lectures at Colgate and his "Text Book of Geology" (1901) covered the general content of that broad science, his personal studies in Geology were almost wholly on its physiographic side; and his physiographic studies soon led him into Geography proper with a strong leaning toward its historical side, as was apparent in his essay on "The Eastern Gateway of the United States" (1899) and in his book on "Geographic Influences in American History" (1901).

It was not so much an originality in investigation as it was a firm grasp of the essential and really scientific spirit of what he called "The New Geography" (1896) and an unusual clearness of educational exposition that gave Brigham his eminence among American Geographers. He was especially successful in setting forth, cautiously as well as critically, the "causal notion" in

Geography, a subject which he treated ably in his presidental address before our Association in 1914. His several text books—"Physical Geography" (with Gilbert, 1902), "Essentials of Geography" (with McFarlane, 1916), and "Manual for Teachers of Geography" (with McFarlane, 1921)—have all contributed to rescuing Geography from the dull, empirical position it so long held in our schools. Great is our indebtedness to this devoted and untiring worker in the science to which he dedicated the best efforts of his best years!

The geographical turn of Brigham's interests led me into two intimate relations with him. The first was during the organization of the Association of American Geographers in 1903, when he so heartily accepted his manifest destiny to become its secretary. He held and filled that office for nine years; and it was during those nine years that the Association entered upon the excellent position it has subsequently held. His attractive personality, coupled with his sound and practical common sense, there stood him in good stead; for a secretary serving under several successive presidents and over a very diverse membership has constant need of bringing about adjustments by means of an amiable and persuasive tact rather than of a dominating force; but Brigham knew very well how to use force skilfully as well as tact amiably, as those must know who recall his part in a discussion at the Chicago meeting of 1907 and his leadership of a round-table conference at the Boston meeting of 1909. The Association was indeed fortunate in having him as its continued officer during its formative period.

My second intimate relation with him was in connection with the Transcontinental Excursion of 1912, when he served during the preparatory months as one of an advisory committee in making up its program, and during the eight weeks of its 13,000-mile peregrinations as its historian. He was a most faithful and dependable member of the Excursion staff; always efficient when called upon to help carry thru our plans, ever ready to explain landscapes and industries to our forty foreign guests, and eminently acceptable to all the American members of the Excursion as a courteous and scholarly representative of what Geography had come to mean among us.

It is constantly borne in upon me, as these memories are reviewed, how greatly Brigham's fine personality added to his scientific standing. He was a man who created warm and enduring friendships, because all the rest of us felt so deep a respect for and so confident a trust in him. Few men whom I have known better exemplified than he did the spirit of comradeship which grows up among workers in similar fields, the world over; a comradeship which constitutes one of the greatest rewards of a scientific career. He chose a fine part to play and he played it so well that his many admiring friends are proud to have been counted as such.

Pasadena, California, July, 1932.

AN APPRECIATION OF ELLEN CHURCHILL SEMPLE, 1863-1932

WALLACE W. ATWOOD

Ellen Churchill Semple, dean of American Geographers, was born in 1863 in Louisville, Kentucky, the daughter of Alexander Bonner Semple and Emerine (Price) Semple. Her parents were of two of the old families of the famous Blue-grass Region of Kentucky, the flower of American culture, and Miss Semple was reared in an atmosphere of refinement and high idealism. Her opportunities for education and training were of the best. In 1882 at the age of nineteen she was graduated from Vassar College with the degree of Bachelor of Arts.

After graduate work in History, then her field, and extensive travels in Europe, she was granted the Master of Arts degree from Vassar College in 1891. The following year she studied at the University of Leipzig under Ratzel, the foremost anthropogeographer the world has ever produced, and under his influence changed her major interest from history to geography. She was one of his brightest students and became his most worthy and renowned successor.

At a time when geography was but an elementary, inchoate subject in America she brought back from her studies in Germany and her travels thruout the Far East, Southern Asia, and the Mediterranean Lands, an inspiration and scientific foundation for the new science which she practically founded. In 1903 her first significant work, "American History and Its Geographic Conditions" was published, the forerunner of numerous later studies in the same field, none of which has surpassed the scholarly standard of her work. Her most ambitious achievement, a masterpiece of literary English as well as of human geography, which appeared in 1911 under the title "Influences of Geographic Environment" shaped the whole trend and content of geographic thought in America, and laid the foundation for the science which has since made such rapid progress.

In addition to these two standard contributions to the literature of her field, she has just completed a third, which is the crowning achievement of her life, a monument of scholarly research and classic presentation to her career of study and joy in her chosen field. The title of this volume is "The Geography of the Mediterranean Region." Numerous magazine articles, of the highest rank, from her pen have from time to time illuminated the magazines devoted to geography and related subjects during her long active life.

Miss Semple was the first geographer whom I called to the staff of the Clark School of Geography when it was founded in 1921. She became an inspiration to the entire group which I have gathered together as a faculty of specialists. She has retained this leadership, as well as the leadership of the profession in America, if not of the world, by virtue of her indefatigable research, her eminent standard of integrity and thoroness in investigation, her genius for clear, forceful expression, and her inspiring and invigorating personality. In 1914 she was awarded the gold medal of the American Geographical Society, the highest professional honor that is bestowed upon American geographers. This year she was awarded the Gold Medal of the Chicago Geographic Society.

Miss Semple's devotion to her work was exceeded only by her devotion to her students. Most of the geographers who are guiding the future of their profession in America today have been her students; or if they have not had this privilege they have been closely enough associated with her to have been inspired and guided by her enthusiasm and advice. Of exquisite personal charm as well as thoro scientific integrity, she was able to exert a compelling influence over all her friends and associates. Her passing constitutes the greatest loss the profession has suffered since its founding in this country, but her unsurpassed works will stand as monuments to point the way in the future as they have in the past.

GEOGRAPHICAL PUBLICATIONS

Clarence F. Jones and Floyd F. Cunningham. **Laboratory Manual in the Geography of South America for College Students.** 133 pp. 41 maps, grafs, and diagrams. Henry Holt & Co., N.Y. 1931. $1.00.

The authors have done an excellent piece of work by contributing a manual suited for laboratory and supplementary use in the geography of South America on the college level. This manual is specifically designed to follow the text "South America by Clarence F. Jones," and its material is organized in chapters corresponding to those of that text.

The questions, suggested tabulations, outline maps to be completed, and grafs serve well as stimulating guides to the study of South America based on the text. The manual, when completely filled out and filed along with any special papers on South America by the student, should form a valuable source of information for future reference. The outline place maps of rivers and cities at the end of the manual furnish a welcome and handy source for work in location.

The exercises have been devised with the object of stimulating in the student an interpretation of man's adjustment to the various physical environments in different parts of South America. The preface sets forth in a clear manner the objectives and plan. This manual, no doubt, will be well received among college teachers and students of geography.

Roy Schofield

State Teachers College

Bemidji, Minnesota

Charles Hodges. **The Background of International Relations.** 743 pp., illus., maps, grafs. John Wiley and Sons, Inc., New York, 1931. $4.00.

This book by the Associate Professor of Politics in New York University is a comprehensive discussion of "Our World Horizons, National and International." It is widely used as a university textbook because it affords a realistic approach to the study of international affairs. It is so thought-provoking that it could be read with profit by teachers of geography, who would find in it a valuable summary of much history and of several significant aspects of geography. It is, moreover, so well written that numerous paragraphs will afford pleasure to those who appreciate fine English.

As the title implies, the book rests upon geographic conditions as well as upon fundamental human and cultural conditions. Dr. Hodges' first-hand acquaintance with the world is exceptional, including years of significant work in the Orient and participation in several European conferences dealing with international affairs. He has also studied relevant geographic and other discussions of the general subject with care. One of the many admirable features of the work are the quotations of key sentences from the writings of many qualified writers on many subjects.

The book is divided into twenty-eight chapters grouped in ten parts, as follows: I, Windows on the World; II, The Nations; III, The Human Setting; IV, The Swarming of the Nations; V, The Society of Nations; VI, The Business of the Nations; VII, Nationalism, Imperialism, and Internationalism; VIII, The Public and Foreign Affairs; IX, The Nations in Arms; X, The Future of International Society.

There is an appendix of 58 pp. of references to literature, and an index.

All those who read this book will be grateful to the author for having presented so well many subjects that progressive citizens in general and geography teachers in particular should be acquainted with. The discussions of the League of Nations and of Nationalism alone make the book worthy of a place in many libraries.

Indiana University Stephen S. Visher